

Amendments to the Claims

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (original): A method of detecting information embedded in an image, comprising:

for each of two or more different halftone modulations, applying a respective filter to the image to identify an ordered sequence of halftone modulations embedded in the image.

Claim 2 (original): The method of claim 1, wherein each halftone modulation is generated from a respective dither matrix.

Claim 3 (original): The method of claim 1, wherein each filter corresponds to a matched filter for a respective halftone modulation.

Claim 4 (original): The method of claim 1, wherein applying a respective filter to the image comprises convolving the filter with the image.

Claim 5 (original): The method of claim 4, further comprising generating a score map for each halftone modulation based upon the convolution of the corresponding filter and the image.

Claim 6 (original): The method of claim 5, further comprising identifying halftone modulations embedded in regions of the image based upon the generated score maps.

Claim 7 (original): The method of claim 6, further comprising selecting one halftone modulation as corresponding to an image region to which multiple halftone modulations are identified based upon the generated score maps.

Claim 8 (original): The method of claim 6, wherein halftone modulations are identified in the image based upon a threshold applied to the score maps.

Claim 9 (original): The method of claim 8, further comprising lowering the threshold in regions to which no halftone modulation has been identified based upon the first threshold.

Claim 10 (original): The method of claim 1, further comprising re-mapping image tone before halftoning.

Claim 11 (original): The method of claim 1, wherein the image comprises a plurality of image levels, and filters are applied to a single image level at a time.

Claim 12 (original): The method of claim 11, wherein the image is a grayscale image comprising multiple gray levels and filters initially are applied to a middle gray level of the image.

Claim 13 (original): The method of claim 12, wherein filters initially are applied to a 50% gray level of the image.

Claim 14 (original): The method of claim 12, wherein filters are applied to a different gray level of the image to resolve uncertainties or ambiguities, or both.

Claim 15 (original): The method of claim 1, wherein the ordered sequence of halftone modulations is identifiable without knowledge of an original image corresponding to the image before halftone modulation.

Claim 16 (original): A system for detecting information embedded in an image, comprising:

a decoder configured to apply a respective filter to the image to identify an ordered sequence of two or more different halftone modulations embedded in the image for each of the halftone modulations.

Claim 17 (original): The system of claim 16, wherein each halftone modulation corresponds to a respective dither matrix and each filter corresponds to a matched filter for a respective dither matrix.

Claim 18 (original): The system of claim 16, wherein the image comprises a plurality of image levels and the decoder is configured to apply filters to a single image level at a time.

Claim 19 (original): The system of claim 18, wherein the decoder is configured to apply filters to a different gray level of the image to resolve uncertainties or ambiguities, or both.

Claim 20 (original): A computer program for detecting information embedded in an image, the computer program residing on a computer-readable medium and comprising computer-readable instructions for causing a computer to:

for each of two or more different halftone modulations, applying a respective filter to the image to identify an ordered sequence of halftone modulations embedded in the image.

Claim 21 (new): The computer program of claim 20, wherein the computer-readable instructions are configured to cause the computer to convolve the filter with the image.

Claim 22 (new): The computer program of claim 21, further comprising computer-readable instructions configured to cause the computer to generate a score map for each halftone modulation based upon the convolution of the corresponding filter and the image.

Claim 23 (new): The computer program of claim 22, further comprising computer-readable instructions configured to cause the computer to identify halftone modulations embedded in regions of the image based upon the generated score maps.

Claim 24 (new): The computer program of claim 23, further comprising computer-readable instructions configured to cause the computer to select one halftone modulation as corresponding to an image region to which multiple halftone modulations are identified based upon the generated score maps.

Claim 25 (new): The computer program of claim 23, wherein the computer-readable instructions are configured to cause the computer to identify halftone modulations in the image based upon a threshold applied to the score maps.

Claim 26 (new): The computer program of claim 25, further comprising computer-readable instructions configured to cause the computer to lower the threshold in regions to which no halftone modulation has been identified based upon the first threshold.

Claim 27 (new): The computer program of claim 20, further comprising computer-readable instructions configured to cause the computer to re-map image tone before halftoning.

Claim 28 (new): The computer program of claim 20, wherein the image comprises a plurality of image levels, and filters are applied to a single image level at a time.

Claim 29 (new): The computer program of claim 28, wherein the image is a grayscale image comprising multiple gray levels and filters initially are applied to a middle gray level of the image.

Claim 30 (new): The computer program of claim 29, wherein the computer-readable instructions are configured to cause the computer to initially apply filters to a 50% gray level of the image.

Claim 31 (new): The computer program of claim 29, wherein the computer-readable instructions are configured to cause the computer to apply filters to a different gray level of the image to resolve uncertainties or ambiguities, or both.